Claims

1. A fusion protein comprising:
(a) a mammalian surfactant protein precursor lacking its C-terminal propeptide, and
(b) a mammalian plasminogen activator,
wherein the surfactant protein precursor is fused at its C-terminus to the N-terminus of the plasminogen activator.

2. The fusion protein of claim 1, wherein one of the protein components (a) or (b) is a human protein.

3. The fusion protein of claim 1 or 2, wherein both protein components (a) and (b) are human proteins.

4. The fusion protein of any of claims 1 to 3, wherein the surfactant protein precursor is selected from surfactant protein B (SP-B) or surfactant protein C (SP-C).

5. The fusion protein of any of claims 1 to 4, wherein the surfactant protein precursor is surfactant protein B (SP-B).

6. A fusion protein comprising:
(a) a mature mammalian surfactant protein, and
(b) a mammalian plasminogen activator,
wherein the mature surfactant protein is fused at its C-terminus or its N-terminus to the N-terminus or the C-terminus of the plasminogen activator, respectively.

7. The fusion protein of claim 6, wherein one of the protein components (a) or (b) is a human protein.

8. The fusion protein of claim 6 or 7, wherein both protein components (a) and (b) are human proteins.

9. The fusion protein of any of claims 6 to 8, wherein the mature surfactant protein is selected from the group consisting of surfactant protein B (SP-B), and surfactant protein C (SP-C).

10. The fusion protein of any of claims 6 to 9, wherein the mature surfactant protein is surfactant protein B (SP-B).

11. A fusion protein of any of claims 1 to 10, wherein the mammalian plasminogen activator is selected from the group consisting of high molecular weight two-chain urokinase-plasminogen activator (HMW-u-PA), low molecular weight two-chain u-PA (LMW-u-PA), low molecular weight u-PA B-chain, recombinant single-chain u-PA (r-scu-PA), tissue-plasminogen activator (t-PA), recombinant t-PA (rt-PA), and its variants r-PA, n-PA, and TNK-t-PA, desmodus salivary plasminogen activator α-1 (bat-PA), streptokinase, and staphylokinase, and catalytically active mutants thereof.

12. The fusion protein according to any of claims 1 to 5 comprising the surfactant protein B (SP-B) precursor N-terminally fused to the low molecular weight two-chain u-PA (LMW-u-PA), as shown in SEQ ID NO: 6 and SEQ ID NO: 7, respectively.

13. The fusion protein according to any of claims 6 to 10 comprising the mature surfactant protein B (SP-B) fused to the low molecular weight two-chain u-PA (LMW-u-PA), as shown in SEQ ID NO: 12 and SEQ ID NO: 13, respectively.

14. The fusion protein of any of claims 1 to 13, which carries a protein or peptide affinity tag at its N-terminus and/or at its C-terminus.

15. A nucleic acid molecule comprising a nucleotide sequence encoding a fusion protein of any of claims 1 to 14.

16. The nucleic acid molecule comprising the nucleotide sequence of SEQ ID No: 6 or SEQ ID NO: 7.

17. The nucleic acid molecule comprising the nucleotide sequence of SEQ ID No: 12 or SEQ ID NO: 13.

18. The nucleic acid molecule according to any of claims 15 to 17, wherein the nucleic acid molecule is operably linked to a regulatory sequence to allow expression of the nucleic acid molecule.

19. The nucleic acid molecule according to claim 18, wherein the regulatory sequence comprises a promoter sequence and a transcription termination sequence.

20. The nucleic acid molecule of any of claims 15 to 19 comprised in a vector.

21. A host cell containing a nucleic acid molecule of any of claims 15 to 20.

22. A method for production of a fusion protein of any of claims 1 to 14, comprising:
(a) introducing a nucleic acid molecule encoding the fusion protein into a suitable vector, and
(b) introducing the recombinant vector obtained in (a) into a suitable host cell or into a suitable cell extract.

23. A pharmaceutical composition comprising a fusion protein of any of claims 1 to 14.

24. Use of a fusion protein of any of claims 1 to 14 for the manufacture of a pharmaceutical composition.

25. The use of claim 24, wherein the pharmaceutical composition is for prevention and/or treatment of inflammatory and interstitial lung diseases.

26. The use of claim 24 or 25, wherein the pharmaceutical composition has fibrinolytic activity.

27. A method of prevention and/or treatment of inflammatory and interstitial lung diseases, comprising the step of administering a fusion protein of any of claims 1 to 14 to a mammal at a dose sufficient to prevent and/or treat the disease.

28. The method according to claim 27, wherein the fusion protein is administered to a mammal by an administration selected from the group consisting of parenteral administration, non-parenteral (enteral) administration, and topical administration.

29. The method according to claim 28, wherein parenteral administration is by aerosol administration or intratracheal instillation.